

EXHIBIT 5

Messages in mpdm-rose--cameron--tyler-1 on 2017-10-09

- RT** **rose (Rose Toomey)** 2017-10-09 12:31 PM
cameron (Cameron Winklevoss) interesting pattern on the last tab - i grouped all the distinct maker/taker pairs and sorted by notional usd volume desc for jun/jul/aug
- RT** **rose (Rose Toomey)** 2017-10-09 12:32 PM
and i notice that hashtech in the top 100 maker/taker pairs is almost exclusively a taker except with cardano
- RT** **rose (Rose Toomey)** 2017-10-09 12:32 PM
the first two rows show hashtech making to cardano 12.15 pct of the time and taking from cardano 10.75 pct of the time
- RT** **rose (Rose Toomey)** 2017-10-09 12:34 PM
hashtech is highlighted pale red, cardano is blue/satomoto is violet, and harsha is orange
- RT** **rose (Rose Toomey)** 2017-10-09 12:35 PM
you can see here that harsha is almost exclusively making, as is satomoto
line 12 shows harsha making to cardano, the only other instance of cardano taking in the top 100 - it was 0.94 pct of notional volume over that time
- RT** **rose (Rose Toomey)** 2017-10-09 12:36 PM
the limit of "top 100" was kind of arbitrary, i could expand it to top 500
- RT** **rose (Rose Toomey)** 2017-10-09 12:36 PM
i wonder if it looks even more distorted if i segment just just ETHUSD and ETHBTC
- RT** **rose (Rose Toomey)** 2017-10-09 01:43 PM
Added a sheet with the top 50 ETHUSD maker/taker crosses, it's even more pronounced - hashtech only makes to cardano and cardano only makes to hashtech - although they both take from a number of other participants. harsha is present primarily as a maker although on row 48 he does take from tomer berda
- RT** **rose (Rose Toomey)** 2017-10-09 01:58 PM
Added a sheet with the top 100 ETHBTC maker/taker crosses, same thing - hashtech only makes to cardano and vice-versa although both of them take from others; harsha present primarily as a maker.
- RT** **rose (Rose Toomey)** 2017-10-09 02:13 PM
opa BTCUSD is actually interesting from this regard too!
- RT** **rose (Rose Toomey)** 2017-10-09 02:15 PM
hashtech is actually only a marker to cardano, and cardano to hashtech
- RT** **rose (Rose Toomey)** 2017-10-09 02:15 PM
with the added fillip that now we see satomoto making to cardano on line 78
- CW** **cameron (Cameron Winklevoss)** 2017-10-09 03:31 PM
Ok so basically on all three books, hashtech only makes to caradano and vice versa?
- RT** **rose (Rose Toomey)** 2017-10-09 03:31 PM
yeah
- RT** **rose (Rose Toomey)** 2017-10-09 03:31 PM
which is really notable
- RT** **rose (Rose Toomey)** 2017-10-09 03:32 PM
that's a feat of timing
- RT** **rose (Rose Toomey)** 2017-10-09 03:34 PM
i had been really puzzled: how did profluent never trade with hashtech? now i know: because they're both mostly only takers
- RT** **rose (Rose Toomey)** 2017-10-09 03:34 PM
i tried a bunch of different approaches but i think this was the most valuable
- RT** **rose (Rose Toomey)** 2017-10-09 03:34 PM
1/ they only make to each other
- RT** **rose (Rose Toomey)** 2017-10-09 03:35 PM
2/ the notional value is concentrated in relatively few trades
- RT** **rose (Rose Toomey)** 2017-10-09 03:35 PM
conclusion, either they rigged it themselves or had assistance from the inside
- CW** **cameron (Cameron Winklevoss)** 2017-10-09 06:15 PM
This is great work Rose — thanks for sharing.
- RT** **rose (Rose Toomey)** 2017-10-09 06:15 PM
glad you're finding it useful!
- rose (Rose Toomey)** 2017-10-09 06:16 PM

RT i'm trying to come up with some good metrics for the future, some reports we can run monthly to make sure we never see numbers like this again

CW **cameron (Cameron Winklevoss)** 2017-10-09 06:49 PM
Nice -- I would imagine SMARTs would be helpful here too

U02GKPU6P reacted with: 100

CW **cameron (Cameron Winklevoss)** 2017-10-09 08:25 PM
So is the \$1,744,936.27 number just the rebates that Hashtech earned or both Hashtech and Cardano combined?

CW **cameron (Cameron Winklevoss)** 2017-10-09 08:31 PM
rose (Rose Toomey) :point_up_2::skin-tone-2:

RT **rose (Rose Toomey)** 2017-10-09 08:31 PM
Looking

CW **cameron (Cameron Winklevoss)** 2017-10-09 08:34 PM
sorry to be more clear, not the total the made, but the total they made from hitting each other.

CW **cameron (Cameron Winklevoss)** 2017-10-09 08:35 PM
It seems that Hashtech crossing w/ Cardano across the books earned them \$1,744,936.27

CW **cameron (Cameron Winklevoss)** 2017-10-09 08:35 PM
Wondering what Cardano made crossing hashtech

CW **cameron (Cameron Winklevoss)** 2017-10-09 08:35 PM
and what combined total is.

RT **rose (Rose Toomey)** 2017-10-09 08:36 PM
from the All Pairs table,
Cardano made 775k and hashtech made 968k

RT **rose (Rose Toomey)** 2017-10-09 08:36 PM
see column D24 on All Pairs tab

RT **rose (Rose Toomey)** 2017-10-09 08:39 PM
so you'll notice that since hashtech was taking against everybody else, they actually paid out in fees for everybody else, and the real losses were confined to hashtech vs cardano with some subsidiary cardano v satomoto, hashtech v satomoto action

CW **cameron (Cameron Winklevoss)** 2017-10-09 08:40 PM
Ah ok, so combined loss from both of them hitting each other is \$1,744,936.27

CW **cameron (Cameron Winklevoss)** 2017-10-09 08:40 PM
rose (Rose Toomey) do you agree?

RT **rose (Rose Toomey)** 2017-10-09 08:41 PM
yes

U02GLRLFN reacted with: +1::skin-tone-2

RT **rose (Rose Toomey)** 2017-10-09 08:41 PM
the rest of the losses IMO can be attributed to poor fee policies

CW **cameron (Cameron Winklevoss)** 2017-10-09 08:41 PM
what is your thinking re: Harsha —

RT **rose (Rose Toomey)** 2017-10-09 08:42 PM
i.e. the top maker rebate level was not adjusted appropriately, the hashtech taker fee of 2bps was just so low it was inviting trouble

RT **rose (Rose Toomey)** 2017-10-09 08:43 PM
inconclusive! harsha was a maker, and possibly some of his volume stemmed from trades that didn't have a lot of economic purpose - i.e. passing funds back and forth on the exchange. but he crossed with a very diverse group of people. if you look at the orange rows, on the Top maker/taker crosses you can see that

RT **rose (Rose Toomey)** 2017-10-09 08:44 PM
we can run this same type of analysis for harsha and you may see him just swapping money round the different markets on the exchange - he actually participates in BTCUSD a lot less than i thought he did!

RT **rose (Rose Toomey)** 2017-10-09 08:44 PM
but i see no evidence he was colluding, he was just there and making, and outside of cardano hashtech was primarily a taker, as was cardano

CW **cameron (Cameron Winklevoss)** 2017-10-09 08:45 PM
So he could have seen the taking and just stood in front of it

RT

rose (Rose Toomey) 2017-10-09 08:45 PM

yeah. and that's not wrong! the clue was, last night sarah had asked me to run profluent to see if they were in on it, and i was initially surprised - if anything, i would have suspected bert of a conspiracy *not* to trade with hashtech

RT

rose (Rose Toomey) 2017-10-09 08:46 PM

so i decided to look at this from a maker/taker perspective, and that's when the surprising pattern emerged - and then i knew exactly why profluent rarely trades with hashtech, they're both primarily takers

RT

rose (Rose Toomey) 2017-10-09 08:46 PM

tbh harsha may have been an annoyance to them more than anything

CW

cameron (Cameron Winklevoss) 2017-10-09 09:22 PM

Yes he could have been in on it or in the way

CW

cameron (Cameron Winklevoss) 2017-10-09 09:22 PM

So you believe the making to each other is the most obvious pattern — I agree

RT

rose (Rose Toomey) 2017-10-09 09:27 PM

the only pair in ETHBTC top 50 where harsha both makes (3.58 pct) and takes (0.08 pct) is against tomer berda, and it's comparatively minor

RT

rose (Rose Toomey) 2017-10-09 09:28 PM

~~i can't find harsha taking once in ETHUSD top 100 maker/taker pairs, only making~~ harsha takes a little against XBT OPPS